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Feb 22, 1994

DOCUMENT-IDENTIFIER: US 5288078 A
TITLE: Control interface apparatus

ABPL:

This invention comprises a control interface between a machine and a physical object. The invention includes an infrared transmitter for transmitting a first infrared signal to an object. Upon striking the object, the infrared signal is reflected forming a reflected infrared signal. An infrared receiver receives the reflected signal from the object and the reflected signal is transformed into a second signal which may be either an analogue type or a yes/no threshold type, representative of a distance between the object and the receiver. The second signal is coupled to the machine. The apparatus is a cordless touch-free controller interface for use with a machine. The present invention is ideally suited for controlling cursor position for use with computers and also with video games.

BSPR:

Lefkowitz, in U.S. Pat. No. 4,524,348, discloses a cordless control interface between a physical object such as a part of the human body, and a machine. Movement of the physical object in a defined field is sensed, and signals corresponding to such movement are received, detected, amplified and produced as an input signal to the machine to move an element of the machine in the same direction as, and in an amount proportional to, movement of the object. In one embodiment, the machine is a video game system and the element is a display signal.

BSPR:

This invention comprises a control interface between a machine and a physical object. The invention includes an infrared transmitter for transmitting a first infrared signal to an object. Upon striking the object, the infrared signal is reflected forming a reflected infrared signal. An infrared receiver receives the reflected signal from the object and the reflected signal is transformed into a second signal representative of a distance between the object and the receiver. The second signal, which may be either an analogue type, or a yes/no threshold type, is coupled to the machine. The apparatus is a cordless touch-free controller interface for use with a machine. The present invention is ideally suited for controlling cursor position for use with computers, video games or other display devices.

DEPR:

In FIG. 1, the hand of the operator 30 is shown to move first to the left and then in an upward direction. If the computer 10 is operating in a conventional display mode, the cursor will traverse a path on the screen 12 mimicking (illustrated at 32) the path traversed by the movement of the operator's hand.

DEPR:

In the Nintendo boxing game, some means must be used to identify a left punch and a right punch, as well as the differences between blows to the face and body jabs. Nintendo sells a controller which requires the player to press buttons or combinations of buttons to signify each such punch. When utilizing the present invention the location of each hand can be uniquely determined by having a screen 46 divide two playing areas each having a transceiver 48. The location of each

hand is separately registered by the appropriate transceiver.

DEPR:

The negative input of the second operational amplifier A2 is also coupled to its output through a resistor R11. The output of the second operational amplifier is coupled to an analog to digital converter through as resistor R12. The terminal of the resistor R12 which is not coupled to the second operational amplifier is coupled to the anode of a diode D1. The cathode of the diode D1 is coupled to the circuit ground.

DEPR:

The channel select lines A, B and C and the inhibit line for the transmitter and receiver are coupled together and driven by a CPU 106. In the preferred embodiment the CPU is an Apple II. The CPU 106 can also be used to generate the 1 KHz square signal used to drive the selected infrared light emitting diode LED1. The output of the receiver op amp A2 is coupled to an analog to digital converter 108 (A/D converter). The A/D converter 108 forms an eight bit binary representation of the strength of the infrared received by the receiver circuit. That signal is supplied to the CPU 106 through pins Pa0 through Pa7. The CPU can control the A/D converter through the conversion control line as shown.

DEPR:

In the alternative, the signal received by the phototransistor 60 can be directly applied to an analog to digital converter 94 as shown in FIG. 6C. The output of the analog to digital converter 94 is applied to a processor 96 which can digitally remove extraneous spurious signals and operate on the desired signal as necessary for the particular application. The processor 96 can be any commercially available processor such as a personal computer, video game or microprocessor chip.

CLPR:

12. The apparatus of claim 11 where the radiation transmitter and radiation receiver are positioned in a generally linear array and where the second radiation transmitter and second radiation receiver are also positioned in a generally linear array.

CLPR:

13. The apparatus of claim 3 where the radiation transmitter and the radiation receiver are positioned in a generally linear array.

Full	Title	CIT.1	REV.1	CLS.1	REF.1	DRAW.1
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